

Notice of Allowability

Application No.

10/815,349

Examiner

SALMAN AHMED

Applicant(s)

MALPANI ET AL.

Art Unit

2476

- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to RCE filed on 2/9/2010.
2. ☒ The allowed claim(s) is/are 1, 5, 7, 9, 10, 12-16, 20, 22, 24, 25, 27-31, 35, 37, 39, 40 and 42-45 (Currently renumbered to 1-27 respectively).
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
* Certified copies not received: _____

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
(a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
(b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
Identifying Indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Janaki K. Davda on 5/4/2010.

The application has been amended as follows:

Claim 31 line 1 "a computer" is changed to --a non-transitory computer--.

Claim 35 line 1 "a computer" is changed to --a non-transitory computer--.

Claim 42 line 1 "a computer" is changed to --a non-transitory computer--.

Allowable Subject Matter

1. Claims 1, 5, 7, 9, 10, 12-16, 20, 22, 24, 25, 27-31, 35, 37, 39, 40 and 42-45 are allowed.

Reason for Allowance

2. The following is an examiner's statement of reasons for allowance:

The prior art of record does not teach the following:

In regards to claim 1, the prior art does not teach receiving input parameters of a list of data paths in a network adapter team, a total number of bytes transferred across the data paths in the network adapter team, a load balancing share of each data path, and a number of bytes transferred on each data path, wherein the load balancing share represents a percentage of a total read or write workload that a given data path

in the network adapter team can take, wherein the load balancing share for at least one data path is different for a read workload and a write workload, wherein the load balancing share is specified by a user; for each data path in a network adapter team, computing a load balancing value by: dividing the total number of bytes by the number of bytes transferred on the data path to generate a first value; and multiplying the first value by the load balancing share of the data path; determining a maximum value of the computed load balancing values; and selecting a data path with the maximum value for use in routing data.

In regards to claim 5, the prior art does not teach receiving input parameters of a list of data paths in the network adapter team, a total number of bytes transferred by the network adapter team in a last time frame, a load balancing share of each data path in the last time frame, and a number of bytes transferred on each data path in the last time frame; computing an actual load balancing share for each data path in a network adapter team by dividing the number of bytes transferred on that data path by a total number of bytes transferred by the network adapter team in the last time frame; computing a difference load balancing value for each data path in the network adapter team by subtracting the load balancing share of the data path from the actual load balancing share of the data path; for each data path, determining whether the load balancing share for the data path in the last time frame is less than the actual load balancing share for the data path; and in response to determining that the load balancing share is less than the actual load balancing share, adjusting the load balancing share of the data path by: determining whether a difference between the

load balancing share and the actual load balancing share is less than a change threshold; and in response to determining that the difference between the load balancing share and the actual load balancing share is less than the change threshold, reducing the load balancing share of the data path; selecting another data path based on the difference load balancing value of each data path; and increasing the load balancing share of the selected data path.

In regards to claim 12, the prior art does not teach intercepting a command issued to a target; determining whether a mode is failover mode or failover and load balancing mode, wherein a first network adapter in a network adapter team is used to route data to the target and a second network adapter in the network adapter team is quiescent with respect to the target in the failover mode, and wherein the first network adapter and the second network adapter are used to route data to the target in the failover and load balancing mode; in response to determining that the mode is the failover and load balancing mode, working with a load balancing component to perform load balancing based on load balancing shares of data paths in the network adapter team; determining whether the command is capable of being routed through a first network adapter in the network adapter team to the target; routing the command through the first network adapter in response to determining that the command is capable of being routed through the first network adapter; routing the command through a second network adapter in the network adapter team in response to determining that the command is not capable of being routed through the first network adapter; and determining whether to switch between the failover mode

and the failover and load balancing mode based on the load balancing shares of data paths between the network adapters in the network adapter team and the target, wherein, when one data path has a hundred percent load balancing share, then failover mode is used.

In regards to claim 16, the prior art does not teach receive input parameters of a list of data paths in a network adapter team, a total number of bytes transferred across the data paths in the network adapter team, a load balancing share of each data path, and a number of bytes transferred on each data path, wherein the load balancing share represents a percentage of a total read or write workload that a given data path in the network adapter team can take, wherein the load balancing share for at least one data path is different for a read workload and a write workload, wherein the load balancing share is specified by a user; for each data path in a network adapter team, compute a load balancing value by: dividing the total number of bytes by the number of bytes transferred on the data path to generate a first value; and multiplying the first value by the load balancing share of the data path; determine a maximum value of the computed load balancing values; and select a data path with the maximum value for use in routing data.

In regards to claim 20, the prior art does not teach receive input parameters of a list of data paths in the network adapter team, a total number of bytes transferred by the network adapter team in a last time frame, a load balancing share of each data path in the last time frame, and a number of bytes transferred on each data path in the last time frame; compute an actual load balancing share for each data path in a

network adapter team by dividing the number of bytes transferred on that data path by a total number of bytes transferred by the network adapter team in the last time frame; compute a difference load balancing value for each data path in the network adapter team by subtracting the load balancing share of the data path from the actual load balancing share of the data path; for each data path, determine whether the load balancing share for the data path in the last time frame is less than the actual load balancing share for the data path; and in response to determining that the load balancing share is less than the actual load balancing share, adjust the load balancing share of the data path by: determining whether a difference between the load balancing share and the actual load balancing share is less than a change threshold; and in response to determining that the difference between the load balancing share and the actual load balancing share is less than the change threshold, reducing the load balancing share of the data path; selecting another data path based on the difference load balancing value of each data path; and increasing the load balancing share of the selected data path.

In regards to claim 27, the prior art does not teach a first network adapter in a network adapter team; a second network adapter in the network adapter team; a failover component; a load balancing component; and circuitry, in the failover component coupled to a bus, operable to: intercept a command issued to a target; determine whether a mode is failover mode or failover and load balancing mode, wherein the first network adapter is used to route data to the target and the second network adapter is quiescent with respect to the target in the failover mode, and

wherein the first network adapter and the second network adapter are used to route data to the target in the failover and load balancing mode; in response to determining that the mode is the failover and load balancing mode, work with a load balancing component to perform load balancing based on load balancing shares of data paths in the network adapter team; determine whether the command is capable of being routed through the first network adapter to the target; route the command through the first network adapter in response to determining that the command is capable of being routed through the first network adapter; route the command through the second network adapter in response to determining that the command is not capable of being routed through the first network adapter; and determine whether to switch between the failover mode and the failover and load balancing mode based on the load balancing shares of data paths between the network adapters in the network adapter team and the target, wherein, when one data path has a hundred percent load balancing share, then failover mode is used.

In regards to claim 31, the prior art does not teach receive input parameters of a list of data paths in a network adapter team, a total number of bytes transferred across the data paths in the network adapter team, a load balancing share of each data path, and a number of bytes transferred on each data path, wherein the load balancing share represents a percentage of a total read or write workload that a given data path in the network adapter team can take, wherein the load balancing share for at least one data path is different for a read workload and a write workload, wherein the load balancing share is specified by a user; for each data path in a network adapter team,

compute a load balancing value by: dividing the total number of bytes by the number of bytes transferred on the data path to generate a first value; and multiplying the first value by the load balancing share of the data path; determine a maximum value of the computed load balancing values; and select a data path with the maximum value for use in routing data.

In regards to claim 35, the prior art does not teach receive input parameters of a list of data paths in the network adapter team, a total number of bytes transferred by the network adapter team in a last time frame, a load balancing share of each data path in the last time frame, and a number of bytes transferred on each data path in the last time frame; compute an actual load balancing share for each data path in a network adapter team by dividing the number of bytes transferred on that data path by a total number of bytes transferred by the network adapter team in the last time frame; compute a difference load balancing value for each data path in the network adapter team by subtracting the load balancing share of the data path from the actual load balancing share of the data path; for each data path, determine whether the load balancing share for the data path in the last time frame is less than the actual load balancing share for the data path; and in response to determining that the load balancing share is less than the actual load balancing share, adjust the load balancing share of the data path by: determining whether a difference between the load balancing share and the actual load balancing share is less than a change threshold; and in response to determining that the difference between the load balancing share and the actual load balancing share is less than the change threshold,

reducing the load balancing share of the data path; selecting another data path based on the difference load balancing value of each data path; and increasing the load balancing share of the selected data path.

In regards to claim 42, the prior art does not teach under control of a failover component, intercept a command issued to a target; determine whether a mode is failover mode or failover and load balancing mode, wherein a first network adapter in a network adapter team is used to route data to the target and a second network adapter in the network adapter team is quiescent with respect to the target in the failover mode, and wherein the first network adapter and the second network adapter are used to route data to the target in the failover and load balancing mode; in response to determining that the mode is the failover and load balancing mode, work with a load balancing component to perform load balancing based on load balancing shares of data paths in the network adapter team; determine whether the command is capable of being routed through a first network adapter in the network adapter team to the target; route the command through the first network adapter in response to determining that the command is capable of being routed through the first network adapter; route the command through a second network adapter in the network adapter team in response to determining that the command is not capable of being routed through the first network adapter; and determine whether to switch between the failover mode and the failover and load balancing mode based on the load balancing shares of data paths between the network adapters in the network adapter team and the target,

wherein, when one data path has a hundred percent load balancing share, then failover mode is used.

The prior art alone or in combination fails to jointly suggest or teach the claimed combination of features as taught by the instant application. Therefore claims 1, 5, 7, 9, 10, 12-16, 20, 22, 24, 25, 27-31, 35, 37, 39, 40 and 42-45 are to be deemed allowable over prior art.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SALMAN AHMED whose telephone number is (571)272-8307. The examiner can normally be reached on 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ayaz Sheikh can be reached on (571)272-3795. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Art Unit: 2476

/Salman Ahmed/

Primary Examiner, Art Unit 2476